Appendix B – Design Features, Mitigation Measures and Monitoring

Codes for and description of the mitigation measures and monitoring are provided in detail in this Appendix. The codes have been applied specifically to the routes/areas proposed in action alternatives (Appendix A). Table B-1 contains project mitigation measures developed to reduce or eliminate impacts on resource areas and identified monitoring elements to measure effectiveness over time. They are incorporated as an integrated part of the action alternatives as applicable (see Ch.2).

Implementation of Mitigation Measures

Mitigations will be implemented as described in Appendix A, where they are applied to proposed NFTS facilities (roads/trails/areas). For routes or areas that need mitigation(s) prior to opening; the route will appear as a designated public motorized road, trail, or area on the next revision of the MVUM after the prescribed mitigations are completed. Scheduling of mitigations is based on the following considerations:

1. Roads and trails where the location or deteriorated condition is causing substantial effects to riparian, watershed, threatened, endangered or sensitive species, or significant cultural resources whether or not motorized vehicle use is occurring.
2. Mitigations on routes requiring relatively low-cost, easily implemented work (such as signage or simple barriers) when mitigations must occur prior to public use.
3. Roads and trails that provide connectivity and important access for the transportation network or other routes that have been identified as providing key public benefit and opportunities, and which require mitigation before designation.

Mitigation Measures and Monitoring

The table below contains mitigation measures and monitoring needs developed to reduce or eliminate impacts on specified resource areas and are incorporated as an integrated part of the proposed action and alternatives. This table acts as a legend for Appendix A, which lists each route and any associated mitigation.

Table B- 1. Project Design Features and Monitoring by Resource Area

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
Transportation		
TR-1	Impacts to trail surface resulting in increased maintenance needs	Wet season closure to protect trailhead and reduce maintenance needs / costs. Specific dates for each route displayed in Appendix B.
TR-2	Existing road or trail improvements such as drainage structures, hardened tread, cribwalls, or bridges are not functioning and/or need maintenance	Reconstruct or rehabilitate improvements using equipment during period with adequate soil moisture to achieve compaction.
TR-3	Road extends into area not authorized for public use (e.g.Camp Tammarack and others)	Place barrier (rock, log, barricade, gate) at road entrance to det.er access

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
TR-4	Trail affecting stream channels	Refer to design features described in soils/watershed for stabilization of stream banks and channel.
TR-5	Trail affecting spring	Refer to design features described in soils/watershed for protection of spring.
TR-6	Fire suppression rehabilitation actions were taken resulted in the route becoming inaccessible for motorized use.	Remove barriers and slash using equipment (TH-51z and TH-55z)
Recreation		
RE-1	Communicate new regs to recreation visitor.	Provide information board
Cultural		
HR-1	Effects to heritage resources are ambiguous (i.e. uncertainty as to origin, agent, age, severity, etc.)	Monitoring Needs: limited-term monitoring to provide information needed to assess site condition and identify appropriate protection or management measures per Motorized Recreation Vehicle Programmatic Agreement (PA)
HR-2	Potential adverse affect to heritage resource	Standard Resource Protection Measures (Motorized Recreation PA Appendix B) are prescribed to ensure that the values of the heritage resources are protected (e.g. project redesign, padding archaeological sites, fencing, barriers, closures, etc.) These are described in detail for specific sites in the Cultural Resources Reports in the project record. Implementation of these protection measures is required prior to NFTS designation.
Air Quality		
AQ-1	Public health hazard of naturally occuring asbestos Public health hazard due to motorized traffic generating airborne asbestos	Routes identified as intersecting terrain potentially containing naturally occurring asbestos (NOA) be field assessed to locate rock outcrops and examine for asbestos type minerals. If these minerals are present, samples would be collected and sent for laboratory analysis to confirm the presence/absence of asbestos type minerals. If no NOA is detected, the proposed route could be added to the NVUM.
Soils/Watershed		
SW-1	Increased road surface erosion and sediment delivery due to use when road is wet	Wet season closure to reduce sediment generated from motorized use; compliance with LRMP (BMP 2-24). Specific dates for each route is displayed in Appendix B.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
SW-2	Runoff causing erosion due to inadequate drainage	Construct drainage structures spaced for appropriate gradient and soils (BMP2-7), or heavy maintenance of existing drainage structures. Reference LRMP S&G 128. Use of mechanized equipment, construct during period with adequate soil moisture for compaction.
SW-3	Runoff causing erosion due to inadequate drainage, in fine textured soils or steeper gradients	Mitigation Measure – Drainage: construct waterbars, dips, or other water diversion feature designed to prevent water from flowing down tread. Harden these structures due to the erodibility of the soil type. Space drainage features for appropriate gradient and soils (BMP2-7), or heavy maintenance of existing drainage structures. Reference LRMP S&G 128. Use of mechanized equipment, construct during period with adequate soil moisture for compaction.
SW-4	Runoff causing erosion due to inadequate drainage, on single-trail or road trails	Construct drainage structures by hand
SW-5	Drainage structure outlets forming gullies and / or delivering sediment to channel or riparian area	Provide sediment filter/energy dissipater using hand work.
SW-6	Human caused fill or deposition in creek channel	Remove fill from channel and redistribute on trail tread to provide for proper channel function (width/depth).
SW-7	Sediment delivery to creek with CWE occurrence, or excessive sediment delivery to any creek	Mitigation Measure - Hardening: install hardened surface (e.g. geoweb structure, concrete block pavers, compacted road base, etc.) on approaches to and from channel crossing. Material will not be placed within the floodplain. Use of mechanized equipment probable.
SW-8	Vehicles crossing perennially moist stream channel interfere with proper channel function (channel bank failure, widening, excessive sediment, capture of stream flow)	Install crossing structure (bridge, bottomless arch, single or multiple culverts) that provides for proper channel function and passage of flow and aquatic organisms (BMP 2-17). Using mechanized equipment.
SW-9	Vehicles crossing stream channel interfere with proper channel function (channel bank failure, widening, excessive sediment, capture of stream flow)	Install low water crossing structure that provides for proper channel function and passage of flow and aquatic organisms (BMP 2-17). Using mechanized equipment.
SW-10	Improperly functioning existing culvert	Repair and/or replace with appropriate crossing for proper channel functioning using mechanized equipment.
SW-11	Improperly functioning existing culvert	Repair for proper channel functioning by hand.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
SW-12	Erosion of inboard ditch	Rock ditch to prevent erosion
SW-13	Existing trail improvements such as drainage structures, hardened tread, cribwalls, or bridges are not functioning and/or need maintenance	Mitigation Measure – Maintenance Activities for Resource Protection: maintenance activities on existing roads and unauthorized routes on existing improvements to stabilize sediment movement.
SW-14	Rutting, severe rill, and / or minor gully erosion	Mitigation Measure - Maintenance Activities for Resource Protection: grading using mechanized equipment during period with adequate soil moisture.
SW-15	Severe gully erosion	Mitigation Measure – Restoration /Stabalization of Trail Tread: Restore/stabilize segments of trails by reshaping, revegetation and/or mulching, provide for adequate drainage. Use of mechanized equipment, work during period with adequate soil moisture for compaction.
SW-16	Severe impacts to soils, riparian areas and / or water quality, or inconsistent with RCOs	Minor realignment within 15 meters of existing centerline. Use of mechanized equipment, work during period with adequate soil moisture for compaction.
SW-17	SW-17 Not assigned to any proposed routes.	
SW-18	Motorized use impacting soil / watershed resources near lakes or streams in MA11	Provide barriers to designate end of motorized trails at least 300 ft from lake and stream destinations, per LRMP. .
SW-19	Continued use on non-designated features OR multiple trailing problems on trail (mudholes, gullies, etc). having impacts on soil / watershed resources such as meadows, riparian areas, or stream	Provide barriers to block access to non system trails, undesignated problem bypass trails, or areas that impact sensitive soils, riparian areas, or streams. In some cases also rehab or obliterate so use cannot continue on non-system feature (BMP 2-26). Use of mechanized equipment.
SW-20	Continued use on non-designated features OR multiple trailing problems on trail (mudholes, gullies, etc). having impacts on soil / watershed resources such as meadows, riparian areas, or streams	Provide barriers to block access to non system trails, undesignated problem bypass trails, or areas that impact sensitive soils, riparian areas, or streams. In some cases also rehab or obliterate so use cannot continue on non-system feature (BMP 2-26). Accomplished with hand work.
SW-21	Off-trail or road motorized use is having impacts on sensitive soils, meadows, other riparian areas, or stream channels.	Signs, barriers, or modification of area using hand tools (such as placement of debris or establishment of native vegetation) to prevent motorized incursion into sensitive area. Application to specific routes is described in Appendix B.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
SW-22	Need for bridge previously identified, NEPA already completed for bridge	Construct bridge, per existing plan, prior to bringing this trail or road into the NFTS.
SW-23	Trail or road at top of unstable streambank impacts riparian vegetation and water quality	Block both ends of trail or road. Leave turnout for parking at east end, but close west end at the edge of PK-31x to protect streambank. (There is one additional parking spot on PK-31x.)
SW-24	See TR-5	
SW-25	Runoff from adjacent system or non-system trail or road contributes to erosion of system trail or road	Mitigation Measure – Stabilize Contributing Features: perform actions to improve drainage on contributing features to control erosion occuring on a NFTS facility
SW-26	SW-26 Not assigned to any proposed routes.	
SW-27	Increased use after designation may affect soil / watershed resources , or existing condition.	Monitoring to determine whether there is a need for actions to protect soil / watershed resources in the long term. Application to specific routes is described in Appendix B.
SW-28	Impacts to water quality and riparian habitat from motorized use specifically at use areas.	Mitigation Measure – Barriers or Signs: prohibit motor vehicle use any closer than 100’ from perennial stream.
Geology		
GE-1	Pubic health hazard of abandoned mine lands (ABL).	Routes identified as intersecting AML sites and/or within a 200 foot radius of the AML site will not be made available for public use until the AML site has been assessed and mitigated for potential exposure to AML hazards.
Botany/TES Plants		
BO-1	Adjacent TES plant species population	Barrier(s) to block access to adjacent TES species. Application to specific routes is described in Appendix B.
BO-2	Adjacent TES plant species population	Minor realignment within 15 meters of existing centerline.
BO-3	Adjacent TES plant species population	Delineate travel way using barriers or trail tread, etc. to eliminate off trail travel, monitor for success.
BO-4	Adjacent TES plant species population	Mitigation Measure – Maintenance Activities for Resource Protection: prior to trail maintenance activities, must consult with botonist for identification of TES species to avoid.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
BO-5	Possible adjacent TES plant species population	Monitoring Needs: evaluate the presence/absence of TES species survey (one time) during mid spring. If TES species present apply design feature BO-1, 2, 3 or most appropriate method to avoid adverse effect to population. If absent no botany mitigation measures are needed.
BO-6	Fen being affected by sediment delivery	Refer to design features described in soils/watershed for this trail. Evaluate with IDT to determine if further actions needed to eliminate sediment effects to fen.
BO-7	Riparian guild TES specis at risk from motorized use at stream crossing	Stream crossing structure should be a bridge as a bride would have the least long term negative efects to the TES species.
Noxious Weeds		
NX-1	Noxious weed population	Eradicate weeds (as described in Chapter 3 Noxious Weeds section) using manual (no herbicide) treatment of population for specified period of time
Wildlife – Terrestrial		
WL-1	Noise disturbance to territorial or nesting goshawks.	Mitigation Measure – Seasonal Restriction: from Feb. 15-Sept 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-2	Noise disturbance to territorial or nesting California spotted owl	Mitigation Measure – Seasonal Restriction: from Mar 1- Aug. 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-3	Noise disturbance to territorial or nesting Great Gray owls	Mitigation Measure – Seasonal Restriction: from Mar 1- Aug. 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-4	Noise disturbance to deer in holding areas	Mitigation Measure – Seasonal Restrictions: for: -Deer holding areas above 5,000 feet elevation – May 15 to June 15 and October 1 through November 30. -Deer holding areas below 5,000 feet elevation – May 1 to June 1 and October 15 to November 30.
WL-5	Noise disturbance to deer in winter ranges	Mitigation Measure – Seasonal Restriction: in deer winter range from December 1 through April 30.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
Wildlife – Aquatic		
AW-1	Sediment entering stream from trail or road/road negatively affecting aquatic TES in-stream habitat	The soils/watershed mitigations identified for each route in Appendix A should reduce or eliminate sediment into the stream channel and reduce impacts to habitat for aquatic or riparian dependant species. Monitoring Needs: If monitoring determines additional impacts are occuring to TES aquatic/riparian species or in-stream habitat, steps to prevent further damage may be taken.
AW-2	Sediment entering stream from trail or road/road negatively affecting aquatic MIS or non-TES in-stream habitat	The soils/watershed mitigations identified for each route in Appendix A should reduce or eliminate sediment into the stream channel and reduce impacts to habitat for aquatic or riparian dependant species. Monitoring Needs: If monitoring determines additional impacts are occuring to MIS aquatic/riparian species or non-TES in-stream habitat, steps to prevent further damage may be taken.
AW-3	Trail or road parallels perennial or seasonal stream channel or meadow within RCA – negatively affecting riparian vegetation associated with aquatic TES species habitat.	Mitigation Measure - Barriers: block access to unauthorized areas being used outside of the existing trail or road to prevent further riparian vegetation damage and allow for natural re-vegetation. Block access to unauthorized use areas adjacent to trail or road located within an RCA. Monitoring Needs: Monitor site for 2 seasons. If monitoring determines additional impacts are occuring to TES aquatic/riparian species or in-stream habitat, steps to prevent further damage may be taken.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
AW-4	Trail or road parallels perennial or seasonal stream channel or meadow within RCA – negatively affecting riparian vegetation associated with aquatic MIS or non -TES species habitat.	Mitigation Measure - Barriers: block access to unauthorized areas being used outside of the existing trail or road to prevent further riparian vegetation damage and allow for natural re-vegetation. Block access to unauthorized use areas adjacent to trail or road located within an RCA. Monitoring Needs: Monitor site for 2 seasons. If monitoring determines additional impacts are occuring to MIS aquatic/riparian species or non-TES in-stream habitat, steps to prevent further damage may be taken.
AW-5	Vehicle crossing perennial or seasonal stream channel is negatively affecting aquatic TES in-stream habitat (ei: widening of channel at crossing, multiple stream crossings, channel bank failure, or sediment entering channel)	The soils/watershed mitigations identified for each route in Appendix A should stabilize the stream channel crossing and reduce impacts to habitat for aquatic or riparian dependant species. Monitoring: If monitoring determines additional resource impacts are occuring to TES aquatic/riparian species or in-stream habitat, steps to prevent further damage may be taken.
AW-6	Vehicle crossing perennial or seasonal stream channel is negatively affecting aquatic MIS or non-TES in-stream habitat (ei: widening of channel at crossing, multiple stream crossings, channel bank failure, or sediment entering channel)	The soils/watershed mitigations identified for each route in Appendix A should stabilize the stream channel crossing and reduce impacts to habitat for aquatic or riparian dependant species. Monitoring Needs: If monitoring determines additional impacts are occuring to MIS aquatic/riparian species or non-TES in-stream habitat, steps to prevent further damage may be taken.
AW-7	Road, Trail, or Use area is located within an RCA of meadow or stream. (S&G 92)	The soils/watershed mitigations identified for each route in Appendix A should reduce or eliminate impacts to habitat for aquatic or riparian dependant species.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
AW-8	Trail or road crosses through travel corridor for aquatic TES species	Mitigation Measure – Seasonal Resritction:during breeding timeframes for the aquatic/riparian species (specific dates listed in seasonal closure plan). Includes signage and barriers, where appropriate to prevent unauthorized access to any additional areas or unauthorized trail or roads along the selected trail or road.
AW-9	Route parallels meadow within RCA, unauthorized access by vehicles in meadow occurring - negatively affecting meadow habitat associated with aquatic TES species	Mitigation Measure - Barriers: block all vehicle access to meadow with either boulders, logs or other native materials. If barrier materials are selected on site, they should be selected from areas outside of the RCA of meadows and streams. Monitoring Needs: monitor sites with barriers to determine effectiveness. If monitoring determines additional impacts are occuring to TES aquatic/riparian species or in-stream habitat, steps to prevent further damage may be taken.
AW-10	Trail or road parallels meadow within RCA, unauthorized access by vehicles in meadow occurring - negatively affecting meadow habitat associated with aquatic MIS and general habitat function	Mitigation Measure - Barriers: block all vehicle access to meadow with either boulders, logs or other native materials. If barrier materials are selected on site, they should be selected from areas outside of the RCA of meadows and streams. Monitoring Needs: monitor sites with barriers to determine effectiveness. If monitoring determines additional impacts are occuring to aquatic/riparian species or in-stream habitat, steps to prevent further damage may be taken.
AW-11	Sediment entering into meadow - negatively affecting meadow habitat associated with aquatic TES, MIS, or general aquatic species	The soils/watershed mitigations identified for each route in Appendix A should minimize or eliminate sediment from enteringt the meadow and reduce impacts to habitat for aquatic or riparian dependant species.
AW-12	Negatively affecting spring habitat associated with aquatic TES species- alteration and/or diversion of spring water, rutting, widening of spring channel crossing, overall degradation of spring area	The soils/watershed mitigations identified for each route in Appendix A should make the use of trail or road at spring site consistent with RCO outlined in LRMP and ROD.

Design Feature Code	Resource Issue	Description of Design Feature/Monitoring Need
AW-13	Trail or road located within CAR – current issues associated with indirect and cumulative effects to aquatic species or habitat.	The soils/watershed mitigations identified for each route in Appendix A should be applied for compliance with LRMP and ROD Standard and Guides for aquatic/riparian species habitat associated with CAR's.